

SEQUENCE LISTING



<110> Jackson, Stephen P
Lakin, Nicholas D
Smith, Graeme CM

<120> Interactions of ATM, ATR or DNA-PK with p53

<130> MEWE-010

<140> US 09/462,962

<141> 2001-06-25

<150> PCT/GB98/02115

<151> 1998-07-16

<150> GB 9714971.0

<151> 1997-07-16

<160> 26

<170> PatentIn Ver. 2.1

<210> 1

<211> 3056

<212> PRT

<213> Homo sapiens

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Leu	Ile	Arg	Asp	Pro	Glu	Thr	Ile	Lys	His	Leu	Asp	Arg	His	Ser	Asp
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Ser	Lys	Gln	Gly	Lys	Tyr	Leu	Asn	Trp	Asp	Ala	Val	Phe	Arg	Phe	Leu
	50					55					60				

Gln	Lys	Tyr	Ile	Gln	Lys	Glu	Thr	Glu	Cys	Leu	Arg	Ile	Ala	Lys	Pro
65				70						75					80

Asn	Val	Ser	Ala	Ser	Thr	Gln	Ala	Ser	Arg	Gln	Lys	Lys	Met	Gln	Glu
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Ile	Ser	Ser	Leu	Val	Lys	Tyr	Phe	Ile	Lys	Cys	Ala	Asn	Arg	Arg	Ala
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Pro	Arg	Leu	Lys	Cys	Gln	Glu	Leu	Leu	Asn	Tyr	Ile	Met	Asp	Thr	Val
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Lys	Asp	Ser	Ser	Asn	Gly	Ala	Ile	Tyr	Gly	Ala	Asp	Cys	Ser	Asn	Ile
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Leu	Leu	Lys	Asp	Ile	Leu	Ser	Val	Arg	Lys	Tyr	Trp	Cys	Glu	Ile	Ser
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Gln	Gln	Gln	Trp	Leu	Glu	Leu	Phe	Ser	Val	Tyr	Phe	Arg	Leu	Tyr	Leu
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Lys Pro Ser Gln Asp Val His Arg Val Leu Val Ala Arg Ile Ile His
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 Ala Val Thr Lys Gly Cys Cys Ser Gln Thr Asp Gly Leu Asn Ser Lys
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 Phe Leu Asp Phe Phe Ser Lys Ala Ile Gln Cys Ala Arg Gln Glu Lys
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 Ser Ser Ser Gly Leu Asn His Ile Leu Ala Ala Leu Thr Ile Phe Leu
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 Lys Thr Leu Ala Val Asn Phe Arg Ile Arg Val Cys Glu Leu Gly Asp
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 Glu Ile Leu Pro Thr Leu Leu Tyr Ile Trp Thr Gln His Arg Leu Asn
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 Asp Ser Leu Lys Glu Val Ile Ile Glu Leu Phe Gln Leu Gln Ile Tyr
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 Ile His His Pro Lys Gly Ala Lys Thr Gln Glu Lys Gly Ala Tyr Glu
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 Ser Thr Lys Trp Arg Ser Ile Leu Tyr Asn Leu Tyr Asp Leu Leu Val
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 Asn Glu Ile Ser His Ile Gly Ser Arg Gly Lys Tyr Ser Ser Gly Phe
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 Cys His Gln Val Phe Asn Glu Asp Thr Arg Ser Leu Glu Ile Ser Gln
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 Ser Tyr Thr Thr Thr Gln Arg Glu Ser Ser Asp Tyr Ser Val Pro Cys
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 Lys Arg Lys Lys Ile Glu Leu Gly Trp Glu Val Ile Lys Asp His Leu
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 Gln Lys Ser Gln Asn Asp Phe Asp Leu Val Pro Trp Leu Gln Ile Ala
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 Thr Gln Leu Ile Ser Lys Tyr Pro Ala Ser Leu Pro Asn Cys Glu Leu
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 Gly Glu Arg Thr Pro Tyr Val Leu Arg Cys Leu Thr Glu Val Ala Leu
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 Leu Lys Leu Trp Asn Lys Ile Trp Cys Ile Thr Phe Arg Gly Ile Ser
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 Ser Glu Gln Ile Gln Ala Glu Asn Phe Gly Leu Leu Gly Ala Ile Ile
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Gln	Gly	Ser	Leu	Val	Glu	Val	Asp	Arg	Glu	Phe	Trp	Lys	Leu	Phe	Thr	515	520	525
Gly	Ser	Ala	Cys	Arg	Pro	Ser	Cys	Pro	Ala	Val	Cys	Cys	Leu	Thr	Leu	530	535	540
Ala	Leu	Thr	Thr	Ser	Ile	Val	Pro	Gly	Ala	Val	Lys	Met	Gly	Ile	Glu	545	550	555
Gln	Asn	Met	Cys	Glu	Val	Asn	Arg	Ser	Phe	Ser	Leu	Lys	Glu	Ser	Ile	565	570	575
Met	Lys	Trp	Leu	Leu	Phe	Tyr	Gln	Leu	Glu	Gly	Asp	Leu	Glu	Asn	Ser	580	585	590
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Glu	Lys	Ile	Leu	Val	Ser	Leu	Thr	Met	Lys	Asn	Cys	Lys	Ala	Ala	Met	610	615	620
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Glu	Glu	Leu	Ser	Phe	Ser	Glu	Val	Glu	Glu	Leu	Phe	Leu	Gln	Thr	Thr	645	650	655
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Tyr	Ser	Ser	Glu	Ile	Thr	Asn	Ser	Glu	Thr	Leu	Val	Arg	Cys	Ser	Arg	705	710	715
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Glu	Glu	Glu	Ala	Tyr	Lys	Ser	Glu	Leu	Phe	Gln	Lys	Ala	Asn	Ser	Leu	740	745	750
Met	Gln	Cys	Ala	Gly	Glu	Ser	Ile	Thr	Leu	Phe	Lys	Asn	Lys	Thr	Asn	755	760	765
Glu	Glu	Phe	Arg	Ile	Gly	Ser	Leu	Arg	Asn	Met	Met	Gln	Leu	Cys	Thr	770	775	780
Arg	Cys	Leu	Ser	Asn	Cys	Thr	Lys	Lys	Ser	Pro	Asn	Lys	Ile	Ala	Ser	785	790	795
Gly	Phe	Phe	Leu	Arg	Leu	Leu	Thr	Ser	Lys	Leu	Met	Asn	Asp	Ile	Ala	805	810	815
Asp	Ile	Cys	Lys	Ser	Leu	Ala	Ser	Phe	Ile	Lys	Lys	Pro	Phe	Asp	Arg	820	825	830
Gly	Glu	Val	Glu	Ser	Met	Glu	Asp	Asp	Thr	Asn	Gly	Asn	Leu	Met	Glu			

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Ala	Ile	Asn	Pro	Leu	Ala	Glu	Glu	Tyr	Leu	Ser	Lys	Gln	Asp	Leu	Leu
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His	Met	Tyr	Leu	Met	Leu	Leu	Lys	Glu	Leu	Pro	Gly	Glu	Glu	Tyr	Pro
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Cys	Ser	Leu	Tyr	Arg	Arg	Asp	Gln	Asp	Val	Cys	Lys	Thr	Ile	Leu	Asn
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His	Val	Leu	His	Val	Val	Lys	Asn	Leu	Gly	Gln	Ser	Asn	Met	Asp	Ser
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Glu	Asn	Ala	Tyr	Leu	Lys	Ala	Gln	Glu	Gly	Met	Arg	Glu	Met	Ser	His
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Val	Leu	Leu	Thr	Leu	Ile	Ala	Val	Val	Leu	Ser	Cys	Ser	Pro	Ile	Cys
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 Phe Gly Tyr Arg Arg Leu Glu Asp Phe Met Ala Ser His Leu Asp Tyr
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 Gly Lys Gln Ile Asp His Leu Phe Ile Ser Asn Leu Pro Glu Ile Val
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 Ile His Tyr Ile Asn Gln Arg Pro Ser Cys Ile Met Asp Val Ser Leu
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 Arg Ser Phe Ser Leu Cys Cys Asp Leu Leu Ser Gln Val Cys Gln Thr
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Ala Val Thr Tyr Cys Lys Asp Ala Leu Glu Asn His Leu His Val Ile
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 Val Gly Thr Leu Ile Pro Leu Val Tyr Glu Gln Val Glu Val Gln Lys
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 Gln Val Leu Asp Leu Leu Lys Tyr Leu Val Ile Asp Asn Lys Asp Asn
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 Glu Asn Leu Tyr Ile Thr Ile Lys Leu Leu Asp Pro Phe Pro Asp His
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 Val Val Phe Lys Asp Leu Arg Ile Thr Gln Gln Lys Ile Lys Tyr Ser
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 Arg Gly Pro Phe Ser Leu Leu Glu Glu Ile Asn His Phe Leu Ser Val
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 Ser Val Tyr Asp Ala Leu Pro Leu Thr Arg Leu Glu Gly Leu Lys Asp
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 Leu Arg Arg Gln Leu Glu Leu His Lys Asp Gln Met Val Asp Ile Met
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 Arg Ala Ser Gln Asp Asn Pro Gln Asp Gly Ile Met Val Lys Leu Val
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 Lys Glu Val Leu Glu Ala Val Gly Ser Cys Leu Gly Glu Val Gly Pro
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 Ile Asp Phe Ser Thr Ile Ala Ile Gln His Ser Lys Asp Ala Ser Tyr
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 Thr Lys Ala Leu Lys Leu Phe Glu Asp Lys Glu Leu Gln Trp Thr Phe
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 Val Arg Ser Ala Ala Val Thr Cys Leu Lys Asn Ile Leu Ala Thr Lys
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 Thr Gly His Ser Phe Trp Glu Ile Tyr Lys Met Thr Thr Asp Pro Met
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 Val Pro Arg Phe Asp Lys Glu Asn Pro Phe Glu Gly Leu Asp Asp Ile
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 Asn Leu Trp Ile Pro Leu Ser Glu Asn His Asp Ile Trp Ile Lys Thr
 1795 1800 1805
 Leu Thr Cys Ala Phe Leu Asp Ser Gly Gly Thr Lys Cys Glu Ile Leu
 1810 1815 1820
 Gln Leu Leu Lys Pro Met Cys Glu Val Lys Thr Asp Phe Cys Gln Thr

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Ser Trp Arg Asn Leu Leu Ser Thr His Val Gln Gly Phe Phe Thr Ser			
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Cys Leu Arg His Phe Ser Gln Thr Ser Arg Ser Thr Thr Pro Ala Asn			
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Leu Asp Ser Glu Ser Glu His Phe Phe Arg Cys Cys Leu Asp Lys Lys			
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Arg Pro Ser Ser Gly Thr Ile Phe Asn Asp Ala Phe Trp Leu Asp Leu			
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Asn Tyr Leu Glu Val Ala Lys Val Ala Gln Ser Cys Ala Ala His Phe			
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Thr Ala Leu Leu Tyr Ala Glu Ile Tyr Ala Asp Lys Lys Ser Met Asp			
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Thr Ile Ser Ser Leu Ser Glu Lys Ser Lys Glu Glu Thr Gly Ile Ser			
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Leu Gln Asp Leu Leu Leu Glu Ile Tyr Arg Ser Ile Gly Glu Pro Asp			
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Ser Leu Tyr Gly Cys Gly Gly Gly Lys Met Leu Gln Pro Ile Thr Arg			
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Leu Arg Thr Tyr Glu His Glu Ala Met Trp Gly Lys Ala Leu Val Thr			
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Tyr Asp Leu Glu Thr Ala Ile Pro Ser Ser Thr Arg Gln Ala Gly Ile			
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Ile Gln Ala Leu Gln Asn Leu Gly Leu Cys His Ile Leu Ser Val Tyr			
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Leu Lys Gly Leu Asp Tyr Glu Asn Lys Asp Trp Cys Pro Glu Leu Glu			
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Glu Leu His Tyr Gln Ala Ala Trp Arg Asn Met Gln Trp Asp His Cys			
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Thr Ser Val Ser Lys Glu Val Glu Gly Thr Ser Tyr His Glu Ser Leu			
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Tyr Asn Ala Leu Gln Ser Leu Arg Asp Arg Glu Phe Ser Thr Phe Tyr			
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 Val Thr His Arg Gln Leu Ser Glu Val Tyr Ile Lys Trp Gln Lys His
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 2260 2265 2270
 Arg Ala Ile Phe Gln Ile Lys Gln Tyr Asn Ser Val Ser Cys Gly Val
 2275 2280 2285
 Ser Glu Trp Gln Leu Glu Glu Ala Gln Val Phe Trp Ala Lys Lys Glu
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 Lys Ala Phe Leu Ser Leu Ala Arg Phe Ser Asp Thr Gln Tyr Gln Arg
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 Ile Glu Asn Tyr Met Lys Ser Ser Glu Phe Glu Asn Lys Gln Ala Leu
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 Leu Lys Arg Ala Lys Glu Glu Val Gly Leu Leu Arg Glu His Lys Ile
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 Gln Thr Asn Arg Tyr Thr Val Lys Val Gln Arg Glu Leu Glu Leu Asp
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 Asp Met Trp Val Phe Arg Leu Cys Ser Leu Trp Leu Glu Asn Ser Gly
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Val Ser Glu Val Asn Gly Met Met Lys Arg Asp Gly Met Lys Ile Pro
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 Thr Tyr Lys Phe Leu Pro Leu Met Tyr Gln Leu Ala Ala Arg Met Gly
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 Thr Lys Met Met Gly Gly Leu Gly Phe His Glu Val Leu Asn Asn Leu
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 Lys Asn Leu Glu Asp Val Val Val Pro Thr Met Glu Ile Lys Val Asp
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 Tyr Glu Val Phe Met Asp Val Cys Gln Asn Phe Gln Pro Val Phe Arg

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Gln	Ser	Ala	Glu	Leu	Val	His	Ile	Asp	Leu	Gly	Val	Ala	Phe	Glu	Gln	
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gaaacaatta aacatctaga tcggcattca gattccaaac aaggaaaata tttgaattgg 360
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<213> Homo sapiens

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Glu Thr Phe Ser Asp Leu Trp Lys Leu Leu Pro Glu Asn Asn Val Leu
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```

Ser Pro Leu Pro Ser Gln Ala Met Asp Asp Leu Met Leu Ser Pro Asp
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```

Asp Ile Glu Gln Trp Phe Thr Glu Asp Pro Gly Pro Asp Glu Ala Pro
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Arg Met Pro Glu Ala Ala Pro Pro Val Ala Pro Ala Pro Ala Thr Pro
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```

Thr Pro Ala Ala Pro Ala Pro Ala Pro Ser Trp Pro Leu Ser Ser Ser
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```

```

Val Pro Ser Gln Lys Thr Tyr Gln Gly Ser Tyr Gly Phe Arg Leu Gly
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Phe Leu His Ser Gly Thr Ala Lys Ser Val Thr Cys Thr Tyr Ser Pro
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Ala Leu Asn Lys Met Phe Cys Gln Leu Ala Lys Thr Cys Pro Val Gln
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Leu Trp Val Asp Ser Thr Pro Pro Pro Gly Thr Arg Val Arg Ala Met
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Ala Ile Tyr Lys Gln Ser Gln His Met Thr Glu Val Val Arg Arg Cys
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Pro Arg Gln Ile Leu Cys Gln Phe Ile Asp Arg Ile Leu Thr Asp Val
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Asn Val Val Ala Val Glu Leu Val Lys Lys Thr Asp Ser Gln Pro Thr
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Ser Val Met Leu Leu Asp Phe Ile Gln His Ile Met Lys Ser Ser Pro
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Leu Met Phe Val Asn Val Ser Gly Ser His Glu Ala Lys Gly Ser Cys
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Ile Glu Phe Ser Asn Trp Ile Ile Thr Arg Leu Leu Arg Ile Ala Ala
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Ser Leu Leu Phe Leu Phe Lys Ser Lys Ser Pro Ala Ile Phe Gly Val
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```

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Arg Phe Leu Ser Gln Leu Asp Glu His Met Gly Tyr Leu Gln Ser Ala
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Pro Leu Gln Leu Met Ser Met Gln Asn Leu Glu Phe Ile Glu Val Thr
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Phe Leu Lys Phe Val Pro Ala Gly Tyr Glu Ser Ala Leu Gln Val Arg						
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Lys Val Tyr Val Arg Asn Ile Cys Lys Ala Leu Leu Asp Val Leu Gly						
	370	375		380		
Ile Glu Val Asp Ala Glu Tyr Leu Leu Gly Pro Leu Tyr Ala Ala Leu						
385	390	395		400		
Lys Met Glu Ser Met Glu Ile Ile Glu Glu Ile Gln Cys Gln Thr Gln						
	405	410		415		
Gln Glu Asn Leu Ser Ser Asn Ser Asp Gly Ile Ser Pro Lys Arg Arg						
	420	425		430		
Arg Leu Ser Ser Ser Leu Asn Pro Ser Lys Arg Ala Pro Lys Gln Thr						
	435	440		445		
Glu Glu Ile Lys His Val Asp Met Asn Gln Lys Ser Ile Leu Trp Ser						
	450	455		460		
Ala Leu Lys Gln Lys Ala Glu Ser Leu Gln Ile Ser Leu Glu Tyr Ser						
465	470	475		480		
Gly Leu Lys Asn Pro Val Ile Glu Met Leu Glu Gly Ile Ala Val Val						
	485	490		495		
Leu Gln Leu Thr Ala Leu Cys Thr Val His Cys Ser His Gln Asn Met						
	500	505		510		
Asn Cys Arg Thr Phe Lys Asp Cys Gln His Lys Ser Lys Lys Lys Pro						
	515	520		525		
Ser Val Val Ile Thr Trp Met Ser Leu Asp Phe Tyr Thr Lys Val Leu						
	530	535		540		
Lys Ser Cys Arg Ser Leu Leu Glu Ser Val Gln Lys Leu Asp Leu Glu						
545	550	555		560		

Ala	Thr	Ile	Asp	Lys	Val	Val	Lys	Ile	Tyr	Asp	Ala	Leu	Ile	Tyr	Met	565	570	575
Gln	Val	Asn	Ser	Ser	Phe	Glu	Asp	His	Ile	Leu	Glu	Asp	Leu	Cys	Gly	580	585	590
Met	Leu	Ser	Leu	Pro	Trp	Ile	Tyr	Ser	His	Ser	Asp	Asp	Gly	Cys	Leu	595	600	605
Lys	Leu	Thr	Thr	Phe	Ala	Ala	Asn	Leu	Leu	Thr	Leu	Ser	Cys	Arg	Ile	610	615	620
Ser	Asp	Ser	Tyr	Ser	Pro	Gln	Ala	Gln	Ser	Arg	Cys	Val	Phe	Leu	Leu	625	630	635
Thr	Leu	Phe	Pro	Arg	Arg	Ile	Phe	Leu	Glu	Trp	Arg	Thr	Ala	Val	Tyr	645	650	655
Asn	Trp	Ala	Leu	Gln	Ser	Ser	His	Glu	Val	Ile	Arg	Ala	Ser	Cys	Val	660	665	670
Ser	Gly	Phe	Phe	Ile	Leu	Leu	Gln	Gln	Gln	Asn	Ser	Cys	Asn	Arg	Val	675	680	685
Pro	Lys	Ile	Leu	Ile	Asp	Lys	Val	Lys	Asp	Asp	Ser	Asp	Ile	Val	Lys	690	695	700
Lys	Glu	Phe	Ala	Ser	Ile	Leu	Gly	Gln	Leu	Val	Cys	Thr	Leu	His	Gly	705	710	715
Met	Phe	Tyr	Leu	Thr	Ser	Ser	Leu	Thr	Glu	Pro	Phe	Ser	Glu	His	Gly	725	730	735
His	Val	Asp	Leu	Phe	Cys	Arg	Asn	Leu	Lys	Ala	Thr	Ser	Gln	His	Glu	740	745	750
Cys	Ser	Ser	Ser	Gln	Leu	Lys	Ala	Ser	Val	Cys	Lys	Pro	Phe	Leu	Phe	755	760	765
Leu	Leu	Lys	Lys	Lys	Ile	Pro	Ser	Pro	Val	Lys	Leu	Ala	Phe	Ile	Asp	770	775	780
Asn	Leu	His	His	Leu	Cys	Lys	His	Leu	Asp	Phe	Arg	Glu	Asp	Glu	Thr	785	790	795
Asp	Val	Lys	Ala	Val	Leu	Gly	Thr	Leu	Leu	Asn	Leu	Met	Glu	Asp	Pro	805	810	815
Asp	Lys	Asp	Val	Arg	Val	Ala	Phe	Ser	Gly	Asn	Ile	Lys	His	Ile	Leu	820	825	830
Glu	Ser	Leu	Asp	Ser	Glu	Asp	Gly	Phe	Ile	Lys	Glu	Leu	Phe	Val	Leu	835	840	845
Arg	Met	Lys	Glu	Ala	Tyr	Thr	His	Ala	Gln	Ile	Ser	Arg	Asn	Asn	Glu	850	855	860
Leu	Lys	Asp	Thr	Leu	Ile	Leu	Thr	Thr	Gly	Asp	Ile	Gly	Arg	Ala	Ala	865	870	875
Lys	Gly	Asp	Leu	Val	Pro	Phe	Ala	Leu	Leu	His	Leu	Leu	His	Cys	Leu	885	890	895

Leu Ser Lys Ser Ala Ser Val Ser Gly Ala Ala Tyr Thr Glu Ile Arg
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 Ala Leu Val Ala Ala Lys Ser Val Lys Leu Gln Ser Phe Phe Ser Gln
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 Tyr Lys Lys Pro Ile Cys Gln Phe Leu Val Glu Ser Leu His Ser Ser
 930 935 940
 Gln Met Thr Ala Leu Pro Asn Thr Pro Cys Gln Asn Ala Asp Val Arg
 945 950 955 960
 Lys Gln Asp Val Ala His Gln Arg Glu Met Ala Leu Asn Thr Leu Ser
 965 970 975
 Glu Ile Ala Asn Val Phe Asp Phe Pro Asp Leu Asn Arg Phe Leu Thr
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 Arg Arg Glu Ile Leu Ile Asn Asn Phe Lys Tyr Ile Phe Ser His Leu
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 Val Cys Ser Cys Ser Lys Asp Glu Leu Glu Arg Ala Leu His Tyr Leu
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 Lys Asn Glu Thr Glu Ile Glu Leu Gly Ser Leu Leu Arg Gln Asp Phe
 1060 1065 1070
 Gln Gly Leu His Asn Glu Leu Leu Leu Arg Ile Gly Glu His Tyr Gln
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 Gln Val Phe Asn Gly Leu Ser Ile Leu Ala Ser Phe Ala Ser Ser Asp
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 Asp Pro Tyr Gln Gly Pro Arg Asp Ile Ile Ser Pro Glu Leu Met Ala
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 Asp Tyr Leu Gln Pro Lys Leu Leu Gly Ile Leu Ala Phe Phe Asn Met
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 Gln Leu Leu Ser Ser Ser Val Gly Ile Glu Asp Lys Lys Met Ala Leu
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Ile Phe His Tyr Leu Ile Ile Glu Asn Arg Asp Ala Val Gln Asp Phe 1235 1240 1245		
Leu His Glu Ile Tyr Phe Leu Pro Asp His Pro Glu Leu Lys Lys Ile 1250 1255 1260		
Lys Ala Val Leu Gln Glu Tyr Arg Lys Glu Thr Ser Glu Ser Thr Asp 1265 1270 1275 1280		
Leu Gln Thr Thr Leu Gln Leu Ser Met Lys Ala Ile Gln His Glu Asn 1285 1290 1295		
Val Asp Val Arg Ile His Ala Leu Thr Ser Leu Lys Glu Thr Leu Tyr 1300 1305 1310		
Lys Asn Gln Glu Lys Leu Ile Lys Tyr Ala Thr Asp Ser Glu Thr Val 1315 1320 1325		
Glu Pro Ile Ile Ser Gln Leu Val Thr Val Leu Leu Lys Gly Cys Gln 1330 1335 1340		
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Leu Gly Ala Ile Asp Pro Gly Arg Leu Asp Phe Ser Thr Thr Glu Thr 1365 1370 1375		
Gln Gly Lys Asp Phe Thr Phe Val Thr Gly Val Glu Asp Ser Ser Phe 1380 1385 1390		
Ala Tyr Gly Leu Leu Met Glu Leu Thr Arg Ala Tyr Leu Ala Tyr Ala 1395 1400 1405		
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Leu Ser Ile Tyr Asp Cys Arg Glu Met Glu Thr Asn Gly Pro Gly His 1425 1430 1435 1440		
Gln Leu Trp Arg Arg Phe Pro Glu His Val Arg Glu Ile Leu Glu Pro 1445 1450 1455		
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Glu Trp Ser Ala Ser Trp Ala Gly Tyr Leu Ile Thr Lys Val Arg His 1490 1495 1500		
Asp Leu Ala Ser Lys Ile Phe Thr Cys Cys Ser Ile Met Met Lys His 1505 1510 1515 1520		
Asp Phe Lys Val Thr Ile Tyr Leu Leu Pro His Ile Leu Val Tyr Val 1525 1530 1535		
Leu Leu Gly Cys Asn Gln Glu Asp Gln Gln Glu Val Tyr Ala Glu Ile 1540 1545 1550		

Met Ala Val Leu Lys His Asp Asp Gln His Thr Ile Asn Thr Gln Asp
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 1685 1690 1695
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 Glu Pro Asp Gln Ile Ile His Tyr His Gly Val Val Lys Ser Met Leu
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 Gly Leu Gly Gln Leu Ser Thr Val Ile Thr Gln Val Asn Gly Val His
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 1825 1830 1835 1840
 Arg Gly Ser Tyr Gln Arg Gly Tyr Glu Tyr Ile Val Arg Leu His Met
 1845 1850 1855
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 1860 1865 1870
 Gly Asp Ser Ser Gln Glu Asp Ser Leu Asn Trp Val Ala Arg Leu Glu
 1875 1880 1885

Met Thr Gln Asn Ser Tyr Arg Ala Lys Glu Pro Ile Leu Ala Leu Arg
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 1955 1960 1965
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Thr His Phe Lys Met Leu Lys Lys Leu Val Glu Glu Ala Thr Phe Ser		
	2245	2250 2255
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Ile Leu Gly Thr His Ala Asn His Ala Ser His Glu Pro Phe Pro Gly		
	2275	2280 2285
His Trp Ala Tyr Ile Ala Gly Phe Asp Asp Met Val Glu Ile Leu Ala		
	2290	2295 2300
Ser Leu Gln Lys Pro Lys Lys Ile Ser Leu Lys Gly Ser Asp Gly Lys		
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Phe Tyr Ile Met Met Cys Lys Pro Lys Asp Asp Leu Arg Lys Asp Cys		
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Pro Leu Asn Asp Glu Cys Gly Ile Ile Glu Trp Val Asn Asn Thr Ala		
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Met Thr Gly Lys Glu Leu Arg Gln Cys Met Leu Pro Lys Ser Ala Ala		
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Leu Ser Glu Lys Leu Lys Val Phe Arg Glu Phe Leu Leu Pro Arg His		
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Ser Met Val Gly Tyr Ile Leu Gly Leu Gly Asp Arg His Gly Glu Asn		
	2465	2470 2475 2480
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<211> 4096

<212> PRT

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<221> SITE

<222> (3316)

<223> Xaa is uncertain

<400> 7

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Glu Thr Leu Ser Ala Ala Asp Arg Cys Gly Ala Ala Leu Ala Gly His
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Gln Leu Ile Arg Gly Leu Gly Gln Glu Cys Val Leu Ser Ser Ser Pro
35 40 45

Ala	Val	Leu	Ala	Leu	Gln	Thr	Ser	Leu	Val	Phe	Ser	Arg	Asp	Phe	Gly	50	55	60	
Leu	Leu	Val	Phe	Val	Arg	Lys	Ser	Leu	Asn	Ser	Ile	Glu	Phe	Arg	Glu	65	70	75	80
Cys	Arg	Glu	Glu	Ile	Leu	Lys	Phe	Leu	Cys	Ile	Phe	Leu	Glu	Lys	Met	85	90	95	
Gly	Gln	Lys	Ile	Ala	Pro	Tyr	Ser	Val	Glu	Ile	Lys	Asn	Thr	Cys	Thr	100	105	110	
Ser	Val	Tyr	Thr	Lys	Asp	Arg	Ala	Ala	Lys	Cys	Lys	Ile	Pro	Ala	Leu	115	120	125	
Asp	Leu	Leu	Ile	Lys	Leu	Leu	Gln	Thr	Phe	Arg	Ser	Ser	Arg	Leu	Met	130	135	140	
Asp	Glu	Phe	Lys	Ile	Gly	Glu	Leu	Phe	Ser	Lys	Phe	Tyr	Gly	Glu	Leu	145	150	155	160
Ala	Leu	Lys	Lys	Lys	Ile	Pro	Asp	Thr	Val	Leu	Glu	Lys	Val	Tyr	Glu	165	170	175	
Leu	Leu	Gly	Leu	Leu	Gly	Glu	Val	His	Pro	Ser	Glu	Met	Ile	Asn	Asn	180	185	190	
Ala	Glu	Asn	Leu	Phe	Arg	Ala	Phe	Leu	Gly	Glu	Leu	Lys	Thr	Gln	Met	195	200	205	
Thr	Ser	Ala	Val	Arg	Glu	Pro	Lys	Leu	Pro	Val	Leu	Ala	Gly	Cys	Leu	210	215	220	
Lys	Gly	Leu	Ser	Ser	Leu	Leu	Cys	Asn	Phe	Thr	Lys	Ser	Met	Glu	Glu	225	230	235	240
Asp	Pro	Gln	Thr	Ser	Arg	Glu	Ile	Phe	Asn	Phe	Val	Leu	Lys	Ala	Ile	245	250	255	
Arg	Pro	Gln	Ile	Asp	Leu	Lys	Arg	Tyr	Ala	Val	Pro	Ser	Ala	Gly	Leu	260	265	270	
Arg	Leu	Phe	Ala	Leu	His	Ala	Ser	Gln	Phe	Ser	Thr	Cys	Leu	Leu	Asp	275	280	285	
Asn	Tyr	Val	Ser	Leu	Phe	Glu	Val	Leu	Leu	Lys	Trp	Cys	Ala	His	Thr	290	295	300	
Asn	Val	Glu	Leu	Lys	Lys	Ala	Ala	Leu	Ser	Ala	Leu	Glu	Ser	Phe	Leu	305	310	315	320
Lys	Gln	Val	Ser	Asn	Met	Val	Ala	Lys	Asn	Ala	Glu	Met	His	Lys	Asn	325	330	335	
Lys	Leu	Gln	Tyr	Phe	Met	Glu	Gln	Phe	Tyr	Gly	Ile	Ile	Arg	Asn	Val	340	345	350	
Asp	Ser	Asn	Asn	Lys	Glu	Leu	Ser	Ile	Ala	Ile	Arg	Gly	Tyr	Gly	Leu	355	360	365	
Phe	Ala	Gly	Pro	Cys	Lys	Val	Ile	Asn	Ala	Lys	Asp	Val	Asp	Phe	Met				

370					375					380					
Tyr	Val	Glu	Leu	Ile	Gln	Arg	Cys	Lys	Gln	Met	Phe	Leu	Thr	Gln	Thr
385					390					395					400
Asp	Thr	Gly	Asp	Tyr	Arg	Val	Tyr	Gln	Met	Pro	Ser	Phe	Leu	Gln	Ser
				405					410					415	
Val	Ala	Ser	Val	Leu	Leu	Tyr	Leu	Asp	Thr	Val	Pro	Glu	Val	Tyr	Thr
			420					425					430		
Pro	Val	Leu	Glu	His	Leu	Val	Val	Met	Gln	Ile	Asp	Ser	Phe	Pro	Gln
		435					440					445			
Tyr	Ser	Pro	Lys	Met	Gln	Leu	Val	Cys	Cys	Arg	Ala	Ile	Val	Lys	Val
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Phe	Leu	Ala	Leu	Ala	Ala	Lys	Gly	Pro	Val	Leu	Arg	Asn	Cys	Ile	Ser
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Thr	Val	Val	His	Gln	Gly	Leu	Ile	Arg	Ile	Cys	Ser	Lys	Pro	Val	Val
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Leu	Pro	Lys	Gly	Pro	Glu	Ser	Glu	Ser	Glu	Asp	His	Arg	Ala	Ser	Gly
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Glu	Val	Arg	Thr	Gly	Lys	Trp	Lys	Val	Pro	Thr	Tyr	Lys	Asp	Tyr	Val
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Asp	Leu	Phe	Arg	His	Leu	Leu	Ser	Ser	Asp	Gln	Met	Met	Asp	Ser	Ile
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Leu	Ala	Asp	Glu	Ala	Phe	Phe	Ser	Val	Asn	Ser	Ser	Ser	Glu	Ser	Leu
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Asn	His	Leu	Leu	Tyr	Asp	Glu	Phe	Val	Lys	Ser	Val	Leu	Lys	Ile	Val
				565					570					575	
Glu	Lys	Leu	Asp	Leu	Thr	Leu	Glu	Ile	Gln	Thr	Val	Gly	Glu	Gln	Glu
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Asn	Gly	Asp	Glu	Ala	Pro	Gly	Val	Trp	Met	Ile	Pro	Thr	Ser	Asp	Pro
		595					600					605			
Ala	Ala	Asn	Leu	His	Pro	Ala	Lys	Pro	Lys	Asp	Phe	Ser	Ala	Phe	Ile
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625					630					635					640
Phe	Phe	Glu	Pro	Trp	Val	Tyr	Ser	Phe	Ser	Tyr	Glu	Leu	Ile	Leu	Gln
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Ser	Thr	Arg	Leu	Pro	Leu	Ile	Ser	Gly	Phe	Tyr	Lys	Leu	Leu	Ser	Ile
			660					665					670		
Thr	Val	Arg	Asn	Ala	Lys	Lys	Ile	Lys	Tyr	Phe	Glu	Gly	Val	Ser	Pro
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Lys	Ser	Leu	Lys	His	Ser	Pro	Glu	Asp	Pro	Glu	Lys	Tyr	Ser	Cys	Phe
	690					695					700				

Ala Leu Phe Val Lys	Phe Gly Lys Glu Val	Ala Val Lys Met Lys Gln
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Tyr Lys Asp Glu Leu	Leu Ala Ser Cys Leu Thr Phe Leu Leu Ser Leu	
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Pro His Asn Ile Ile	Glu Leu Asp Val Arg Ala Tyr Val Pro Ala Leu	
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Gln Met Ala Phe Lys	Leu Gly Leu Ser Tyr Thr Pro Leu Ala Glu Val	
	755	760 765
Gly Leu Asn Ala Leu	Glu Glu Trp Ser Ile Tyr Ile Asp Arg His Val	
	770	775 780
Met Gln Pro Tyr Tyr	Lys Asp Ile Leu Pro Cys Leu Asp Gly Tyr Leu	
	785 790	795 800
Lys Thr Ser Ala Leu	Ser Asp Glu Thr Lys Asn Asn Trp Glu Val Ser	
	805	810 815
Ala Leu Ser Arg Ala	Ala Gln Lys Gly Phe Asn Lys Val Val Leu Lys	
	820	825 830
His Leu Lys Lys Thr	Lys Asn Leu Ser Ser Asn Glu Ala Ile Ser Leu	
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Glu Glu Ile Arg Ile	Arg Val Val Gln Met Leu Gly Ser Leu Gly Gly	
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Gln Ile Asn Lys Asn	Leu Leu Thr Val Thr Ser Ser Asp Glu Met Met	
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Lys Ser Tyr Val Ala	Trp Asp Arg Glu Lys Arg Leu Ser Phe Ala Val	
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Pro Phe Arg Glu Met	Lys Pro Val Ile Phe Leu Asp Val Phe Leu Pro	
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Arg Val Thr Glu Leu	Ala Leu Thr Ala Ser Asp Arg Gln Thr Lys Val	
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Ala Ala Cys Glu Leu	Leu His Ser Met Val Met Phe Met Leu Gly Lys	
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Leu Tyr Lys Arg Thr	Phe Pro Val Leu Leu Arg Leu Ala Cys Asp Val	
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Asp Gln Val Thr Arg	Gln Leu Tyr Glu Pro Leu Val Met Gln Leu Ile	
	980	985 990
His Trp Phe Thr Asn	Asn Lys Lys Phe Glu Ser Gln Asp Thr Val Ser	
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Leu Leu Glu Ala Ile	Leu Asp Gly Ile Val Asp Pro Val Asp Ser Thr	
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Ile Lys Gln Ile Thr Pro Gln Gln Gln Glu Lys Ser Pro Val Asn Thr
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 1075 1080 1085
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 Leu Gly Thr Ile Gln Gln Cys Cys Asp Ala Ile Asp His Leu Cys Arg
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 1155 1160 1165
 Val Lys Trp Leu Leu Ala His Cys Gly Arg Pro Gln Thr Glu Cys Arg
 1170 1175 1180
 His Lys Ser Ile Glu Leu Phe Tyr Lys Phe Val Pro Leu Leu Pro Gly
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 Ser Gly Ile Leu Ala Gln Pro Thr Leu Leu Tyr Leu Arg Gly Pro Phe
 1235 1240 1245
 Ser Leu Gln Ala Thr Leu Cys Trp Leu Asp Leu Leu Leu Ala Ala Leu
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 1265 1270 1275 1280
 Val Leu Gly Thr Glu Ala Gln Ser Ser Leu Leu Lys Ala Val Ala Phe
 1285 1290 1295
 Phe Leu Glu Ser Ile Ala Met His Asp Ile Ile Ala Ala Glu Lys Cys
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 Phe Gly Thr Gly Ala Ala Gly Asn Arg Thr Ser Pro Gln Glu Gly Glu
 1315 1320 1325
 Arg Tyr Asn Tyr Ser Lys Cys Thr Val Val Val Arg Ile Met Glu Phe
 1330 1335 1340
 Thr Thr Thr Leu Leu Asn Thr Ser Pro Glu Gly Trp Lys Leu Leu Lys
 1345 1350 1355 1360
 Lys Asp Leu Cys Asn Thr His Leu Met Arg Val Leu Val Gln Thr Leu

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Ala His Leu Pro Asp Val Cys Val Asn Leu Met Lys Ala Leu Lys Met 1395 1400 1405		
Ser Pro Tyr Lys Asp Ile Leu Glu Thr His Leu Arg Glu Lys Ile Thr 1410 1415 1420		
Ala Gln Ser Ile Glu Glu Leu Cys Ala Val Asn Leu Tyr Gly Pro Asp 1425 1430 1435 1440		
Ala Gln Val Asp Arg Ser Arg Leu Ala Ala Val Val Ser Ala Cys Lys 1445 1450 1455		
Gln Leu His Arg Ala Gly Leu Leu His Asn Ile Leu Pro Ser Gln Ser 1460 1465 1470		
Thr Asp Leu His His Ser Val Gly Thr Glu Leu Leu Ser Leu Val Tyr 1475 1480 1485		
Lys Gly Ile Ala Pro Gly Asp Glu Arg Gln Cys Leu Pro Ser Leu Asp 1490 1495 1500		
Leu Ser Cys Lys Gln Leu Ala Ser Gly Leu Leu Glu Leu Ala Phe Ala 1505 1510 1515 1520		
Phe Gly Gly Leu Cys Glu Arg Leu Val Ser Leu Leu Leu Asn Pro Ala 1525 1530 1535		
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Phe Ser His Gly Glu Tyr Phe Tyr Ser Leu Phe Ser Glu Thr Ile Asn 1555 1560 1565		
Thr Glu Leu Leu Lys Asn Leu Asp Leu Ala Val Leu Glu Leu Met Gln 1570 1575 1580		
Ser Ser Val Asp Asn Thr Lys Met Val Ser Ala Val Leu Asn Gly Met 1585 1590 1595 1600		
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Lys Leu Ala Thr Thr Ile Leu Gln His Trp Lys Lys Cys Asp Ser Trp 1620 1625 1630		
Trp Ala Lys Asp Ser Pro Leu Glu Thr Lys Met Ala Val Leu Ala Leu 1635 1640 1645		
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His Gly Ser Phe Pro Glu Val Phe Thr Thr Tyr Ile Ser Leu Leu Ala 1665 1670 1675 1680		
Asp Thr Lys Leu Asp Leu His Leu Lys Gly Gln Ala Val Thr Leu Leu 1685 1690 1695		

Pro Phe Phe Thr Ser Leu Thr Gly Gly Ser Leu Glu Glu Leu Arg Arg
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 Val Leu Glu Gln Leu Ile Val Ala His Phe Pro Met Gln Ser Arg Glu
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 Phe Pro Pro Gly Thr Pro Arg Phe Asn Asn Tyr Val Asp Cys Met Lys
 1730 1735 1740
 Lys Phe Leu Asp Ala Leu Glu Leu Ser Gln Ser Pro Met Leu Leu Glu
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 Thr Gln Val Gly Leu Leu Glu Ser Val Tyr Glu Met Phe Arg Lys Asp
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 Ser Thr Ile Val Val Asp Ala Ile Asp Val Leu Lys Ser Arg Phe Thr
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 Val His Ala Lys Glu Ser Lys Ile Asn Gln Val Phe His Gly Ser Cys
 1890 1895 1900
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 1985 1990 1995 2000
 Lys Lys Lys Tyr Ile Glu Ile Arg Lys Glu Ala Arg Glu Ala Ala Asn
 2005 2010 2015
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 2020 2025 2030

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 2115 2120 2125
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 2130 2135 2140
 Phe Leu Ala Lys Leu Val Ile Asn Thr Glu Glu Val Phe Arg Pro Tyr
 2145 2150 2155 2160
 Ala Lys His Trp Leu Ser Pro Leu Leu Gln Leu Ala Ala Ser Glu Asn
 2165 2170 2175
 Asn Gly Gly Glu Gly Ile His Tyr Met Val Val Glu Ile Val Ala Thr
 2180 2185 2190
 Ile Leu Ser Trp Thr Gly Leu Ala Thr Pro Thr Gly Val Pro Lys Asp
 2195 2200 2205
 Glu Val Leu Ala Asn Arg Leu Leu Asn Phe Leu Met Lys His Val Phe
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 His Pro Lys Arg Ala Val Phe Arg His Asn Leu Glu Ile Ile Lys Thr
 2225 2230 2235 2240
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 Phe Glu Lys Phe Ser Gly Lys Asp Pro Asn Ser Lys Asp Asn Ser Val
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 Gly Ile Gln Leu Leu Gly Ile Val Met Ala Asn Asp Leu Pro Pro Tyr
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 Asp Pro Gln Cys Gly Ile Gln Ser Ser Glu Tyr Phe Gln Ala Leu Val
 2290 2295 2300
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 2340 2345 2350
 Gln Asn Thr Met Glu Asp Lys Phe Ile Val Cys Leu Asn Lys Val Thr

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Ser Thr Thr Cys Arg Glu Gln Met Tyr Asn Ile Leu Met Trp Ile His		
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Arg Leu Pro Ser Asn Thr Leu Asp Arg Leu Leu Ala Leu Asn Ser Leu		
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Tyr Ser Pro Lys Ile Glu Val His Phe Leu Ser Leu Ala Thr Asn Phe		
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Leu Leu Glu Met Thr Ser Met Ser Pro Asp Tyr Pro Asn Pro Met Phe		
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Asp Trp Arg Phe Arg Ser Thr Val Leu Thr Pro Met Phe Val Glu Thr		
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Trp Leu Thr Gly Ser Ser Thr Asp Pro Leu Val Asp His Thr Ser Pro		
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<212> PRT

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10

41

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<220>
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Trp Lys Leu

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